

Advanced STEMI 12-Lead ECG

Stroke and Cardiac System Conference

Sam Kapphahn, DO
Interventional Cardiologist
Essentia Health-Fargo
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Disclosures

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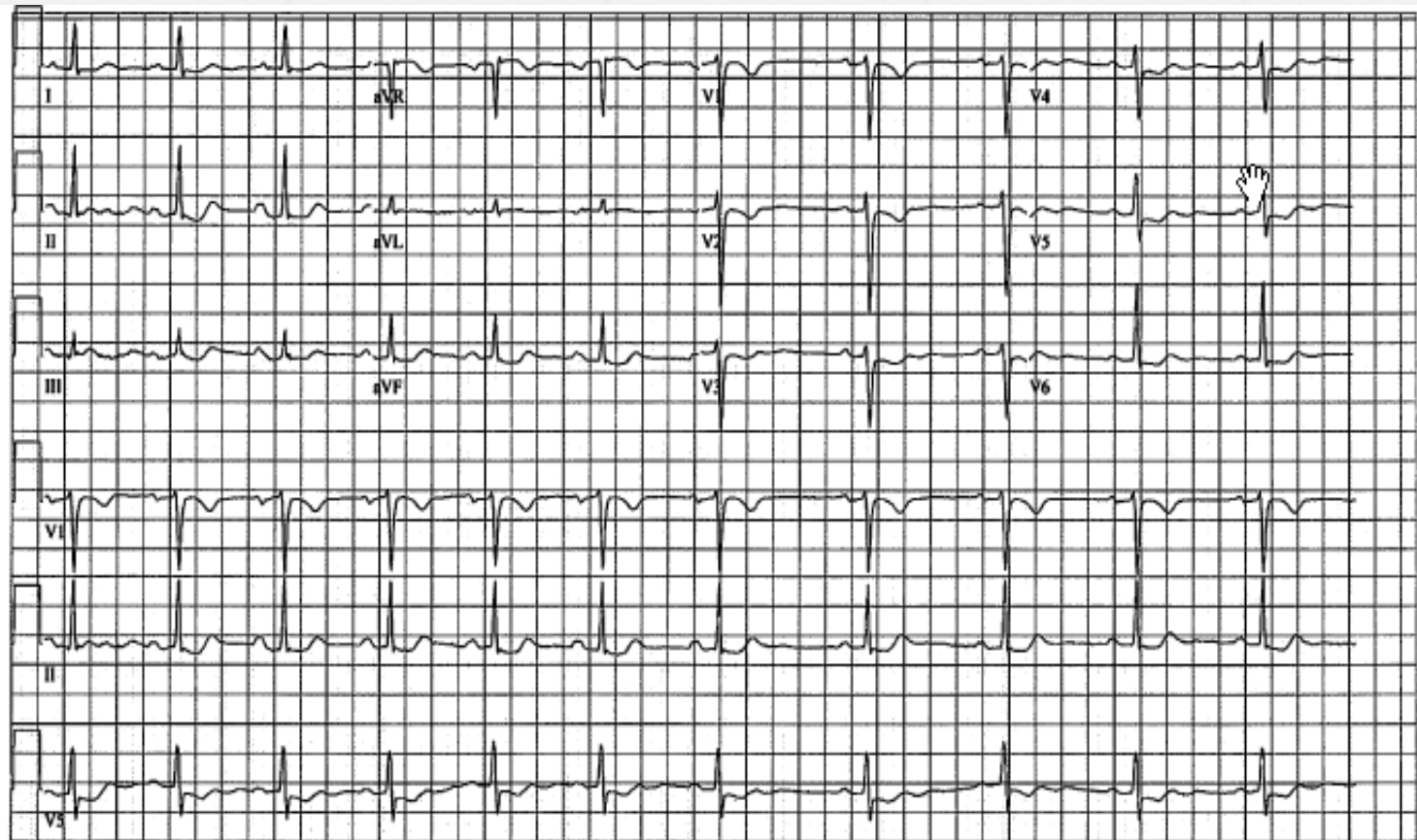
Overview

- Review challenging ECGs of STEMI and STEMI mimickers
- Goal: Identify potentials for high risk events
 - Recognize that not all that ST elevates represents Acute Coronary Syndrome

Case 1

- o 64 year old man presents to the ED by personal vehicle due to chest discomfort, nausea at 0230.
- o Symptom onset 900pm of prior evening.
- o Prior history of Coronary artery bypass surgery with 4 grafts
- o Recently stopped all medications
- o Ongoing tobacco use

ECG 1

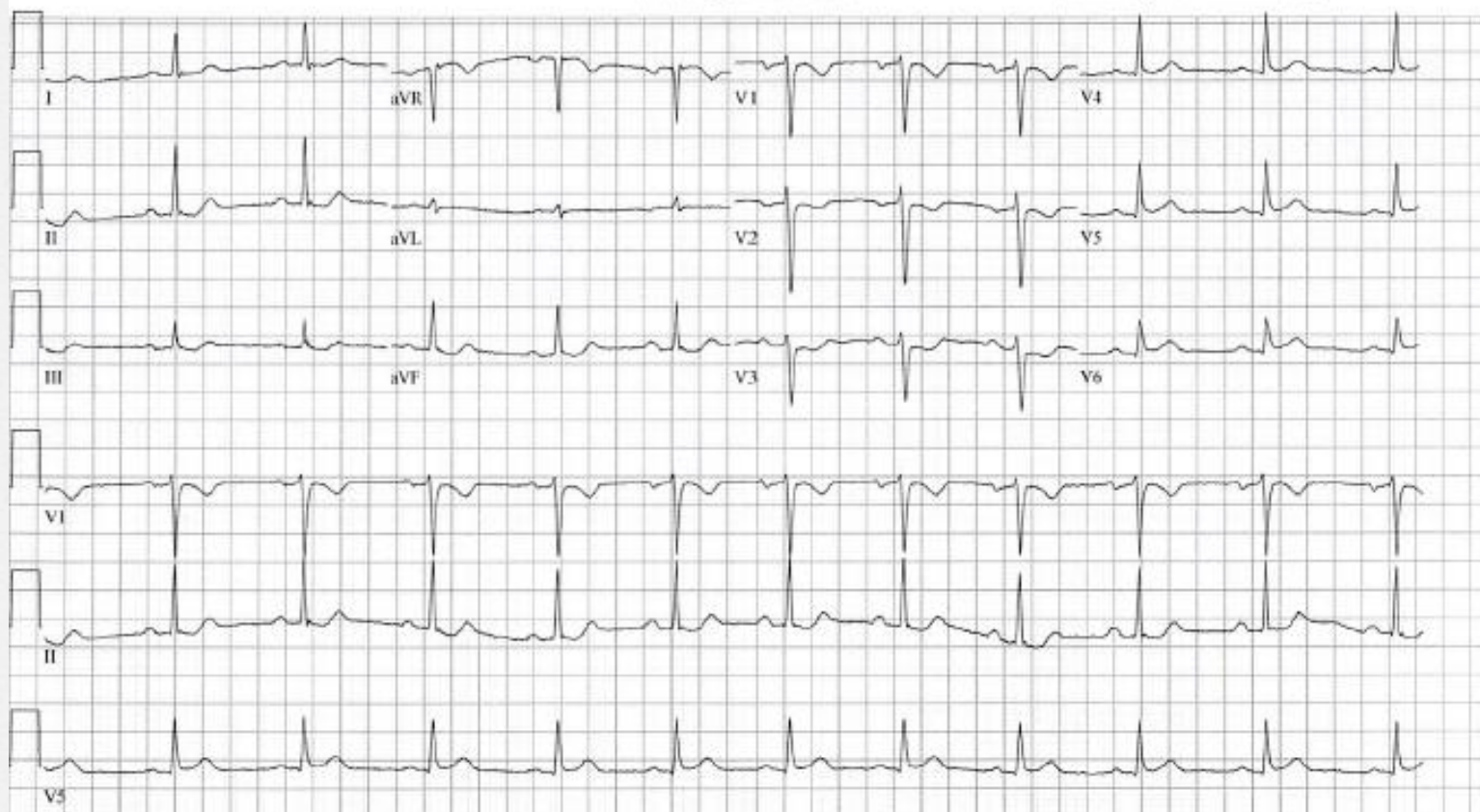


ECG 2

Test ind: POSTERIOR EKG

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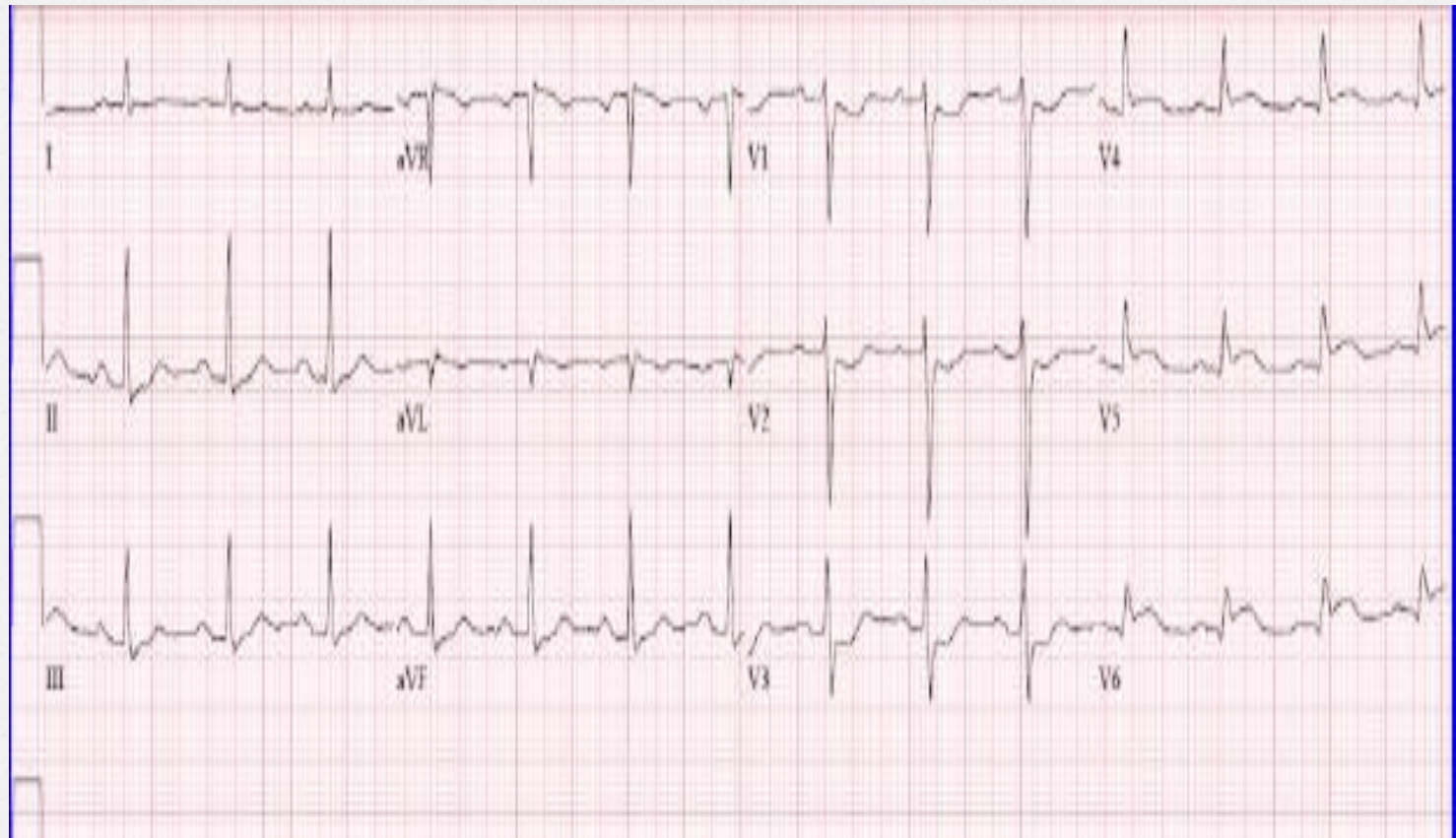
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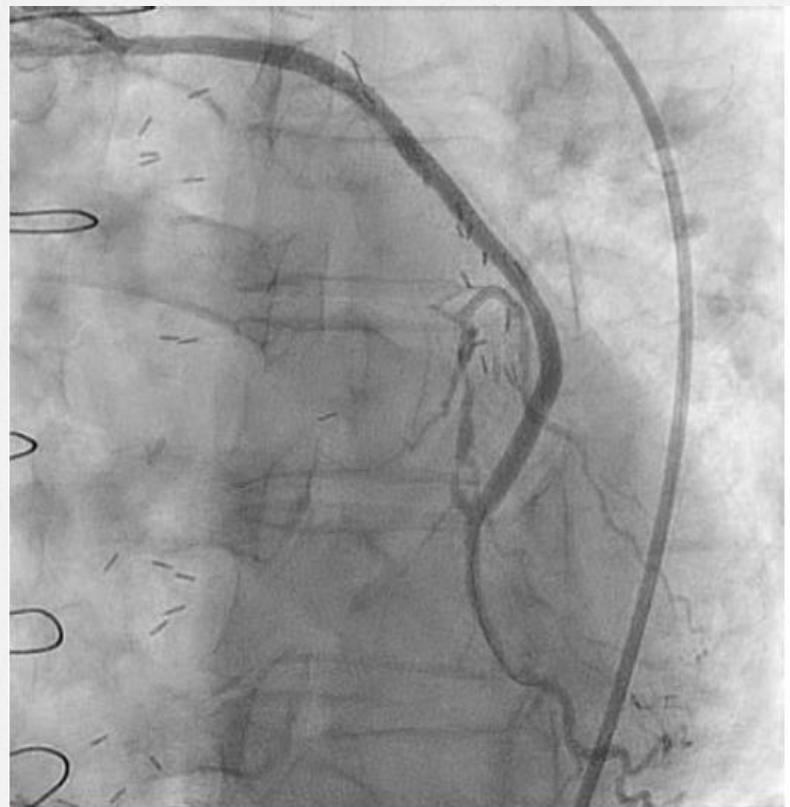
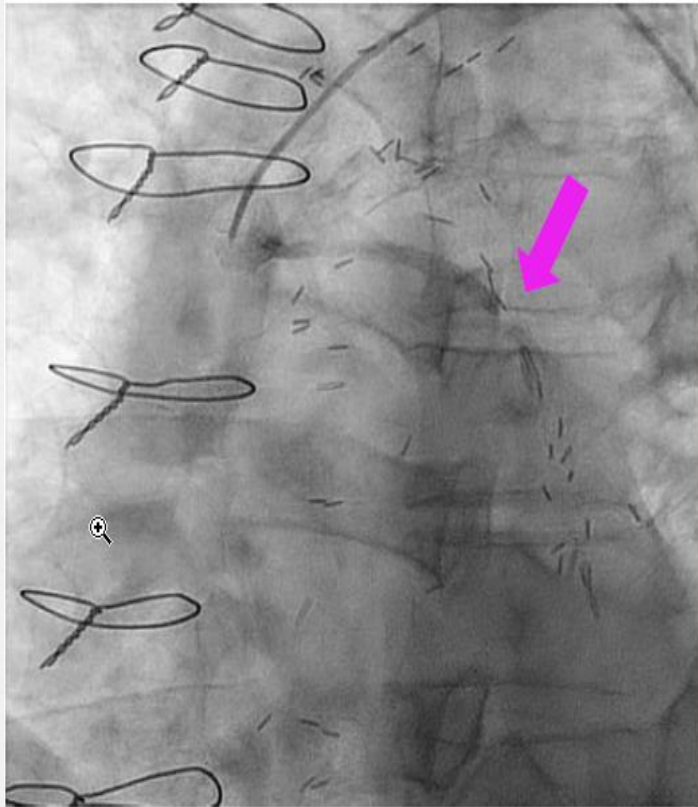
Case 1

- Initial ECG was without specific changes for STEMI
- While awaiting admission for NonSTEMI in ED, patient experienced cardiac arrest due to PEA
- Brought to cardiac catheterization after arrest and repeat ECG

ECG 3



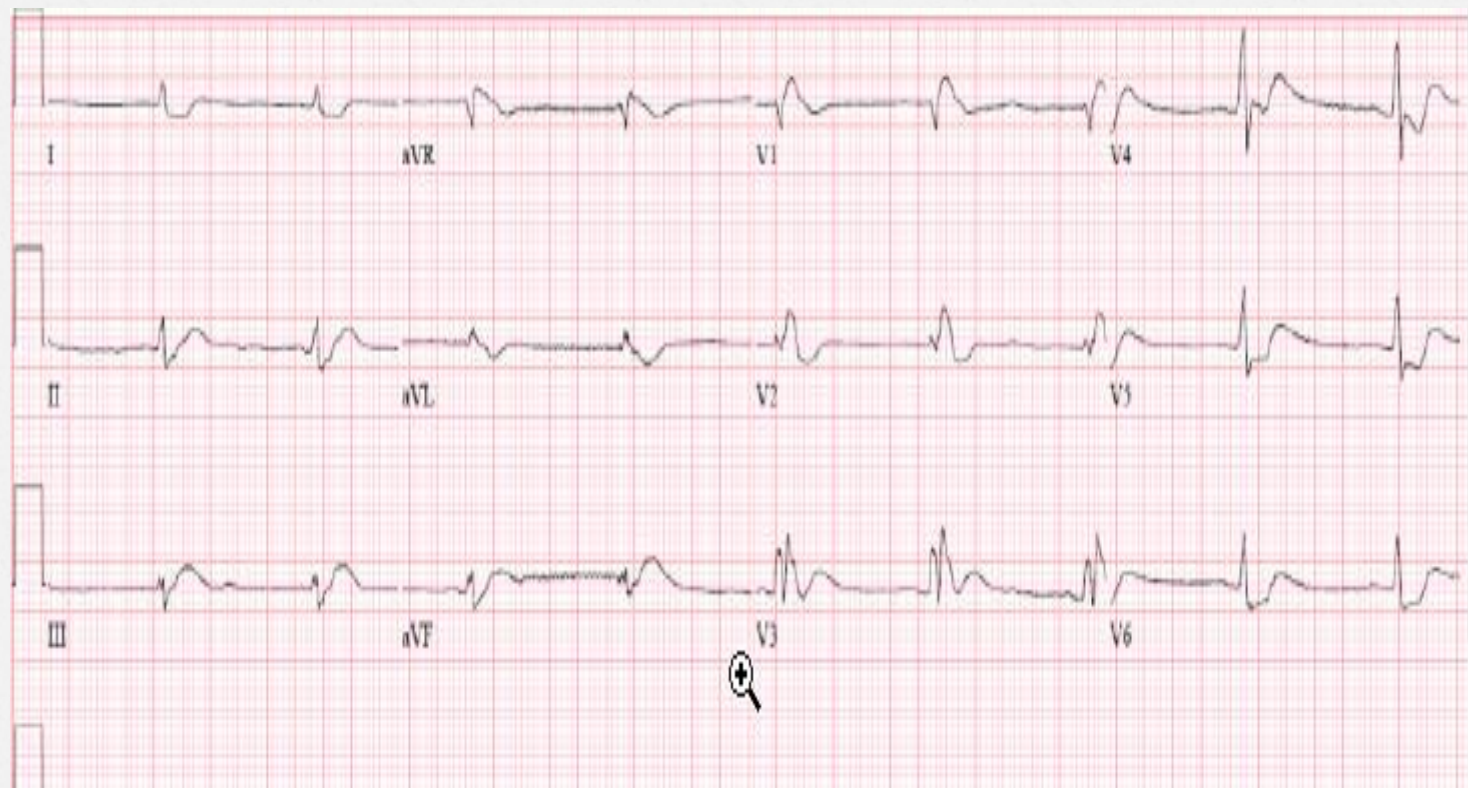
Cardiac catheterization



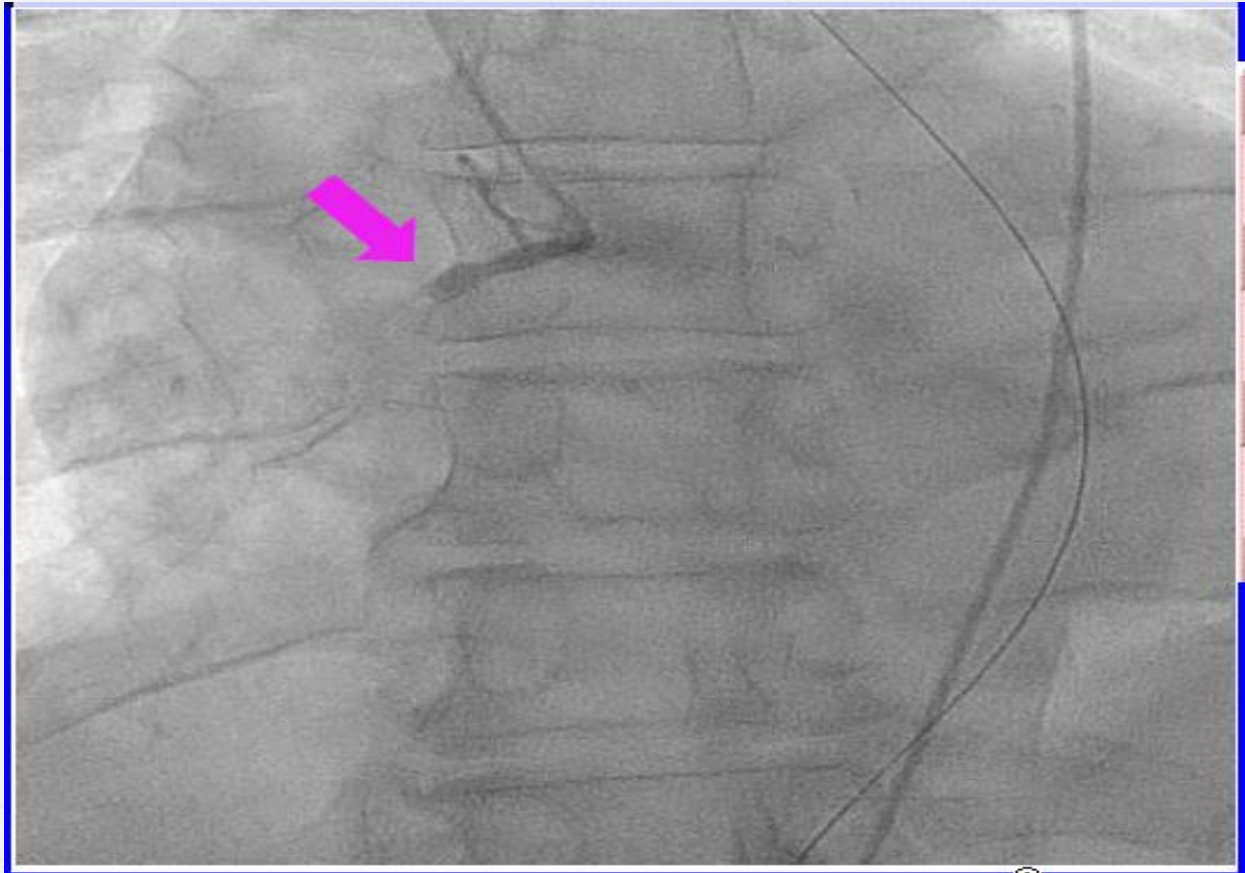
Case 2

- 60 year old man assessed by EMS after being called to scene of MVA
 - Patient as driver had presumed LOC and crashed his vehicle into a house.
 - Prior to arrival to ED, patient had cardiac arrest with successful restoration
 - Proceeded directly to cardiac catheterization lab for emergent angiography

ECG 1



Coronary Angiogram



Case 2

- Patient underwent PCI with restoration of flow
- Unfortunately, clinical course worsened and he developed cardiac arrest without restoration of circulation and passed away

Case 3

- 46 year old man with history of tobacco use called 911 due to chest pain and shortness of breath while mowing his lawn
- Upon arrival by EMS, he initially was conscious and conversant
 - While receiving medical assessment, he became unresponsive with seizure-like activity
 - Ventricular fibrillation identified-treated with CPR, defibrillation and epinephrine
 - Intubated for airway protection

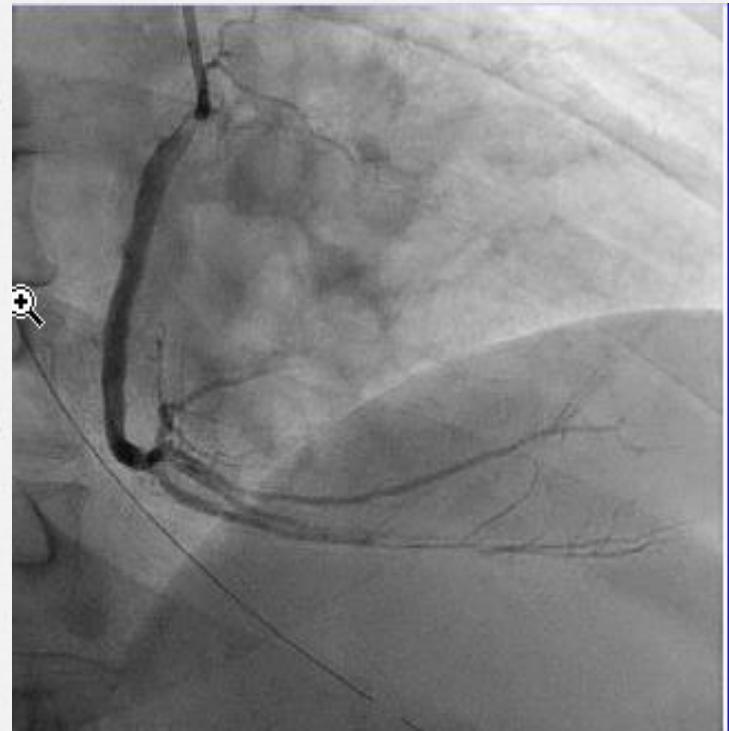
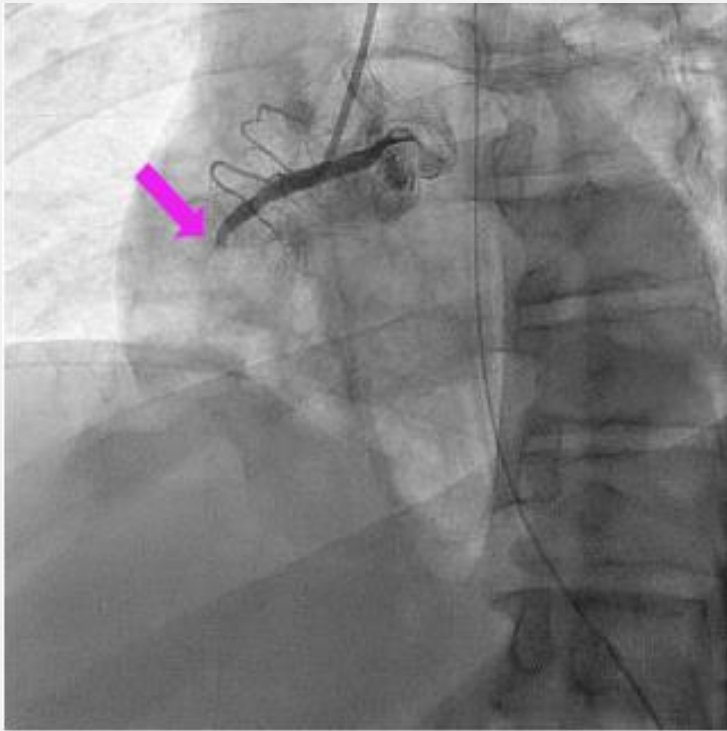
Case 3

- Initial rhythm was ventricular fibrillation
- ECG obtained in regional ED

Case 3



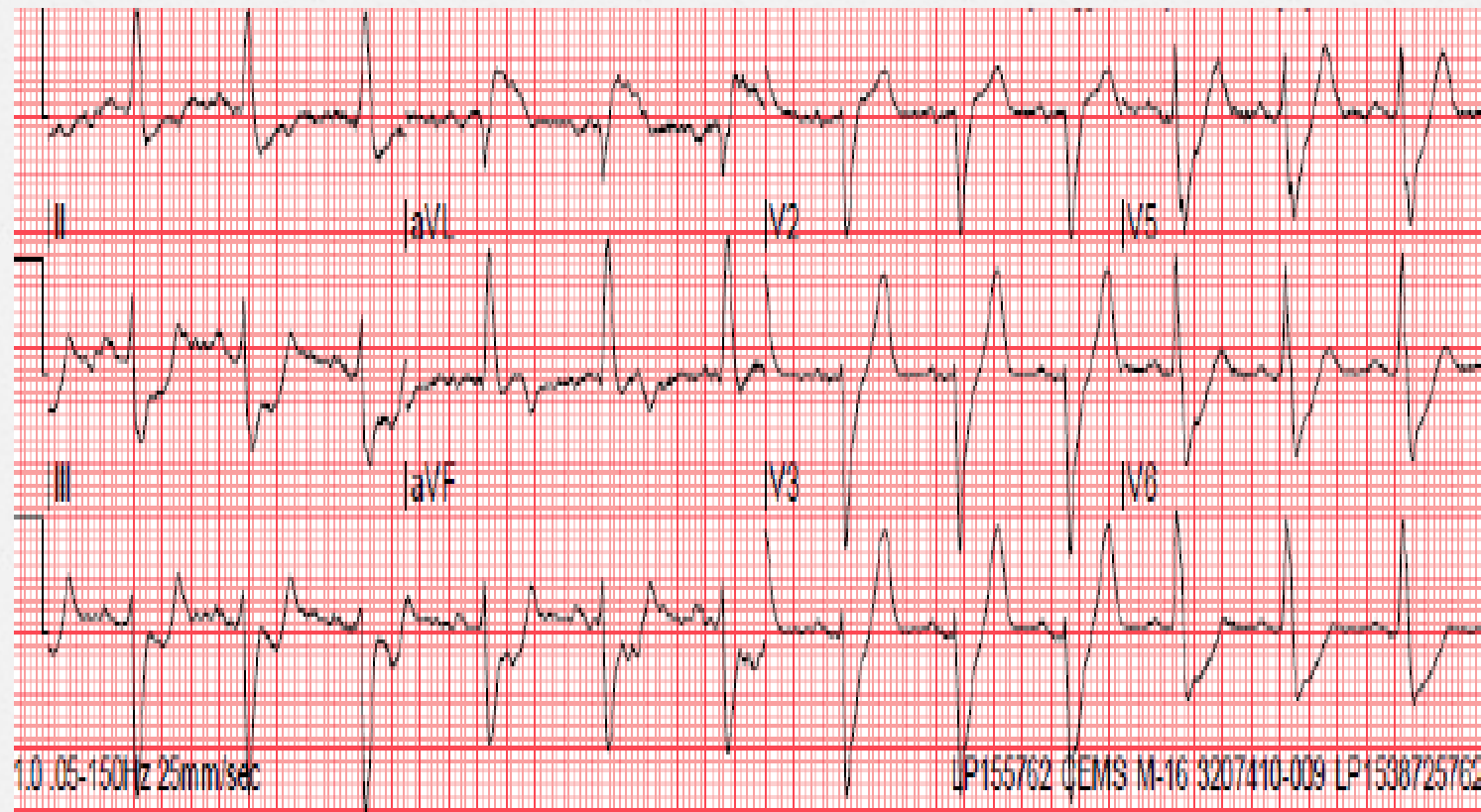
Coronary angiography



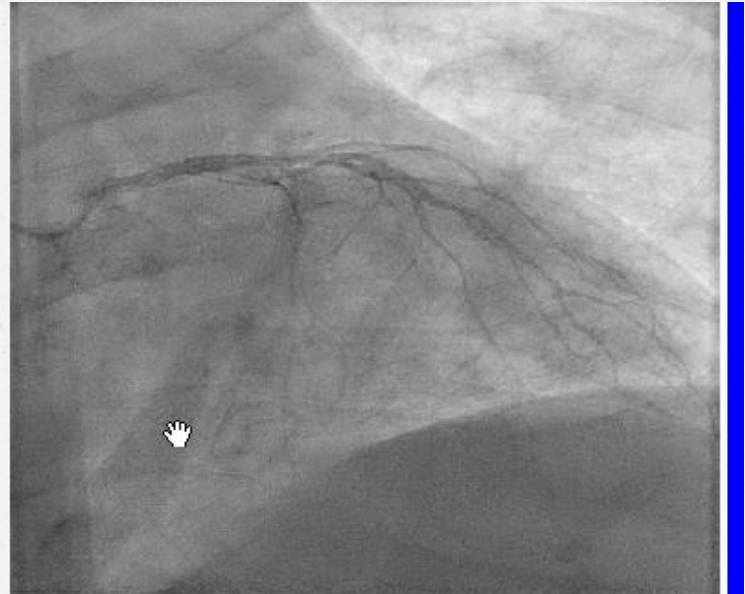
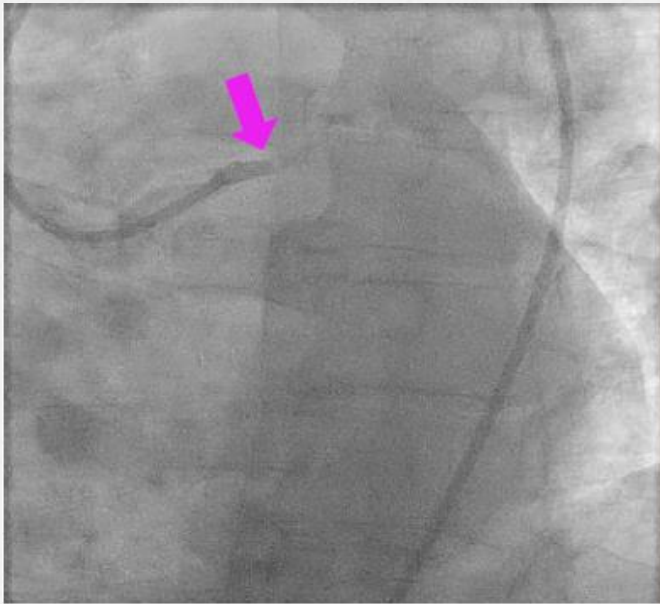
Case 4

- 58 year old man with history of HTN, diabetes, obesity and tobacco use with collapse at work with return of consciousness
 - Upon regaining alertness, he complained of severe chest pain

Case 4



Cardiac catheterization



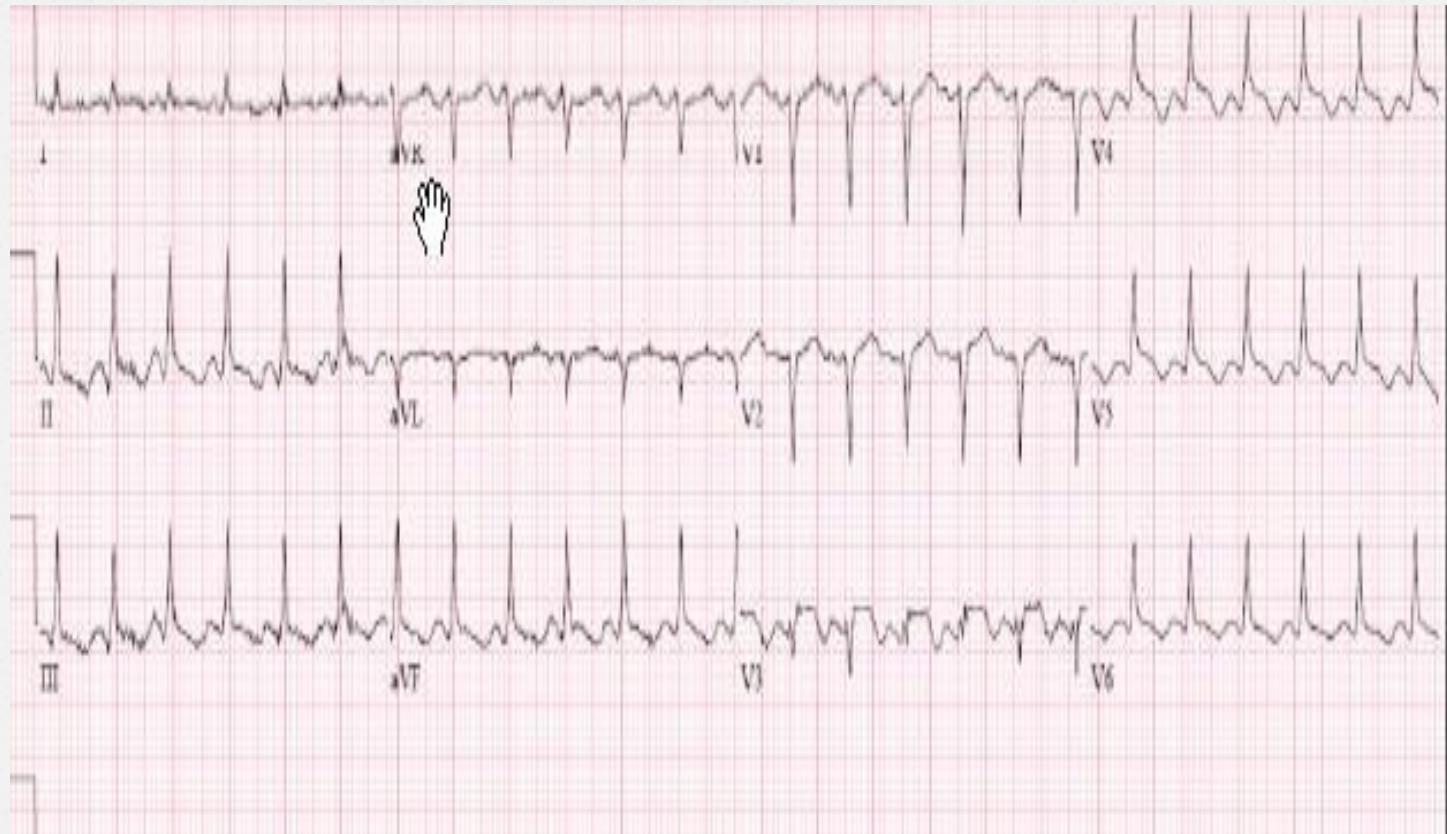
Case 4

- Post angiography, patient had cardiac arrest due to ventricular defibrillation
 - Received defibrillation and placement of Intra-aortic balloon pump
 - Discharged in good condition 3 days later.

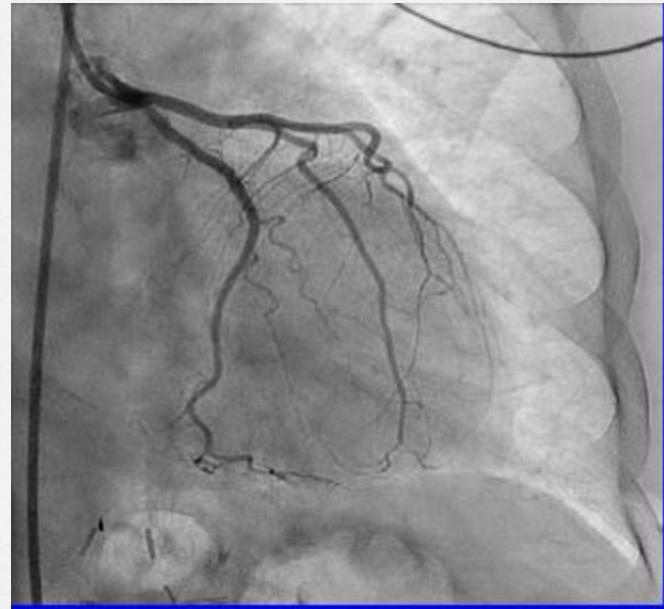
Case 5

- 64 year old woman without history of CV risk factors presented by personal vehicle to ED with complaint of chest pain for 20 minutes prior to arrival

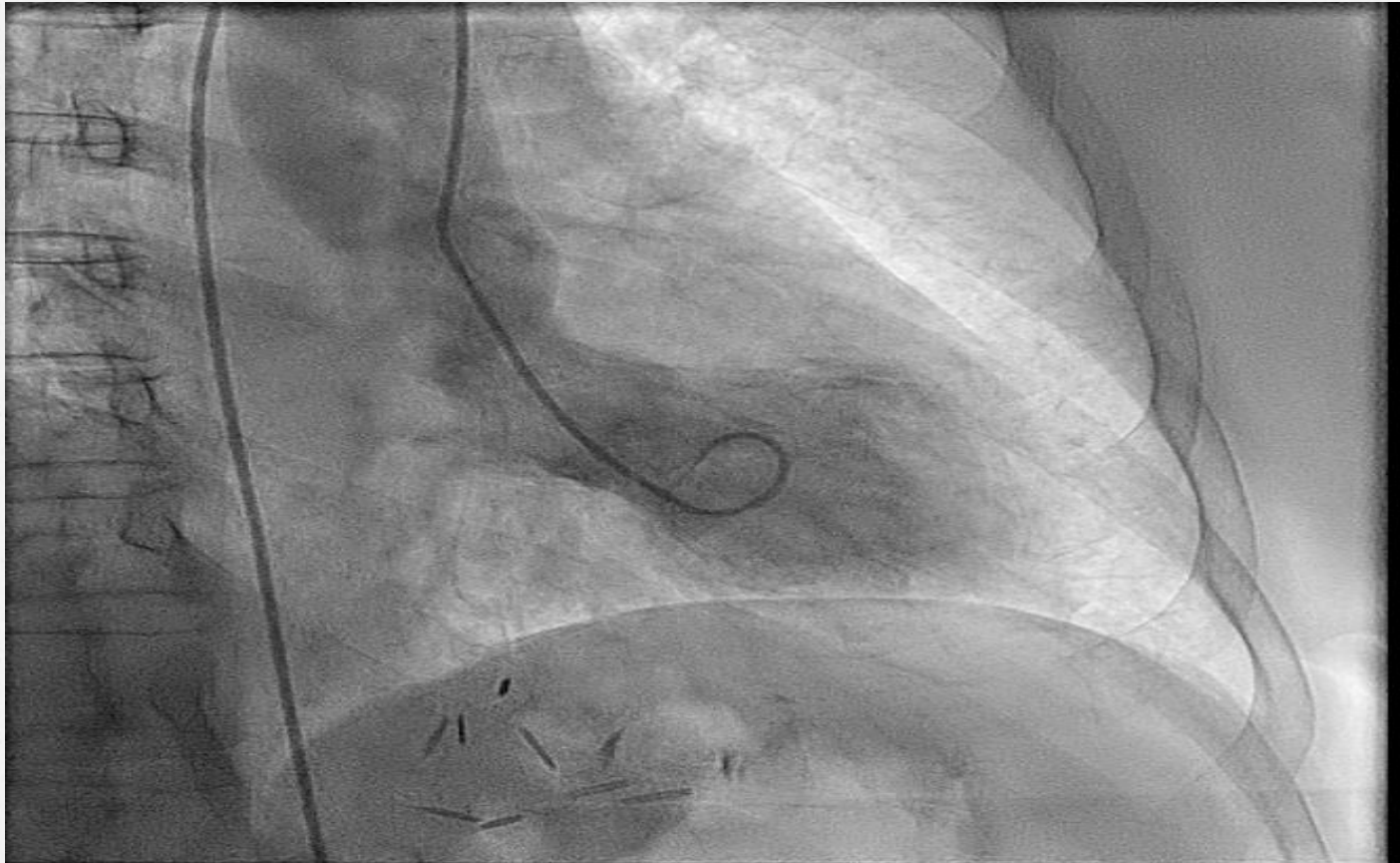
ECG



Coronary angiography



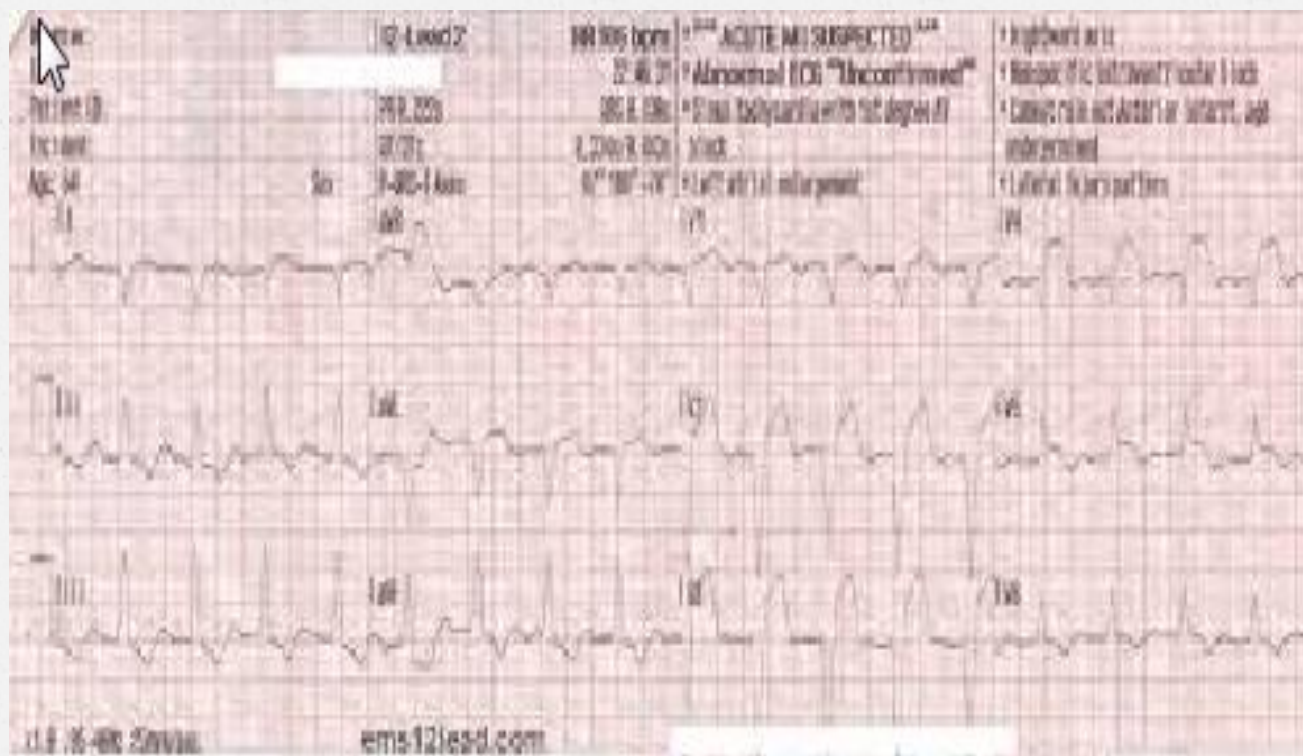
Ventriculography



Case 6

- 72 year old female with prior history of diabetes mellitus, HTN and chronic Left bundle branch block presents to the ED brought by EMS due to symptoms of chest pain for 1 hour

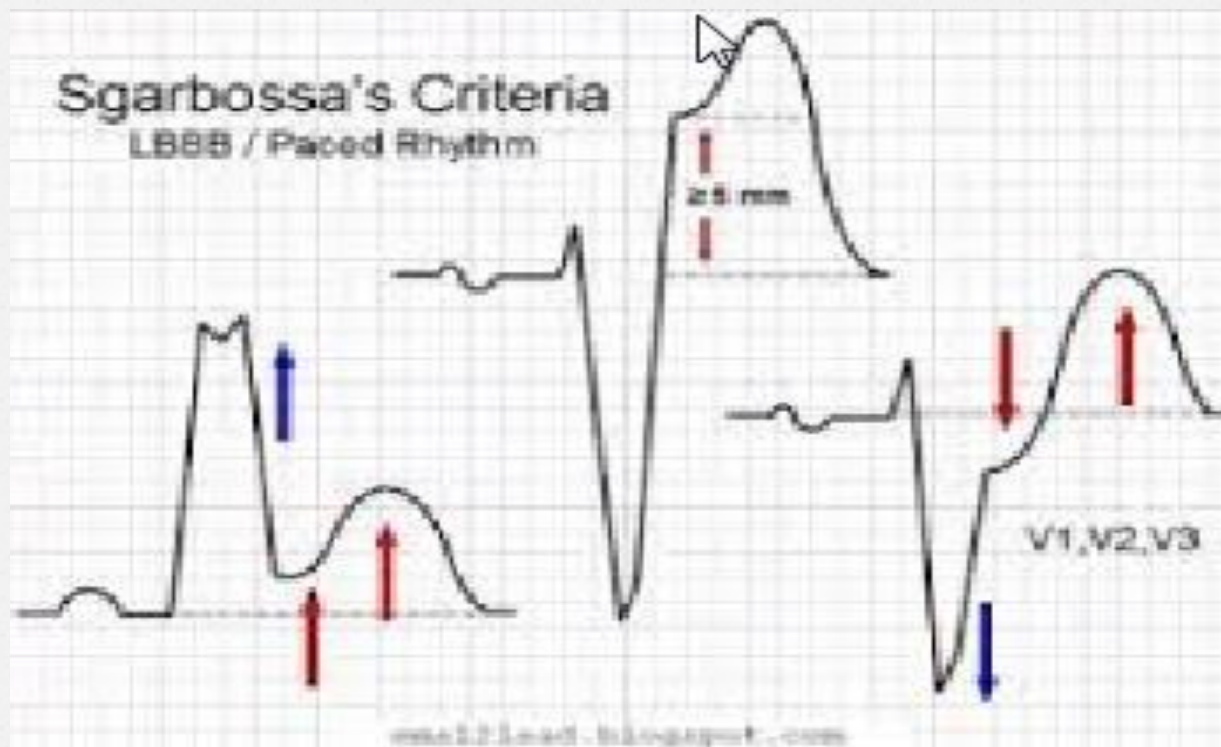
ECG



Diagnosis?

◦ Acute ST-Elevation Myocardial infarction!

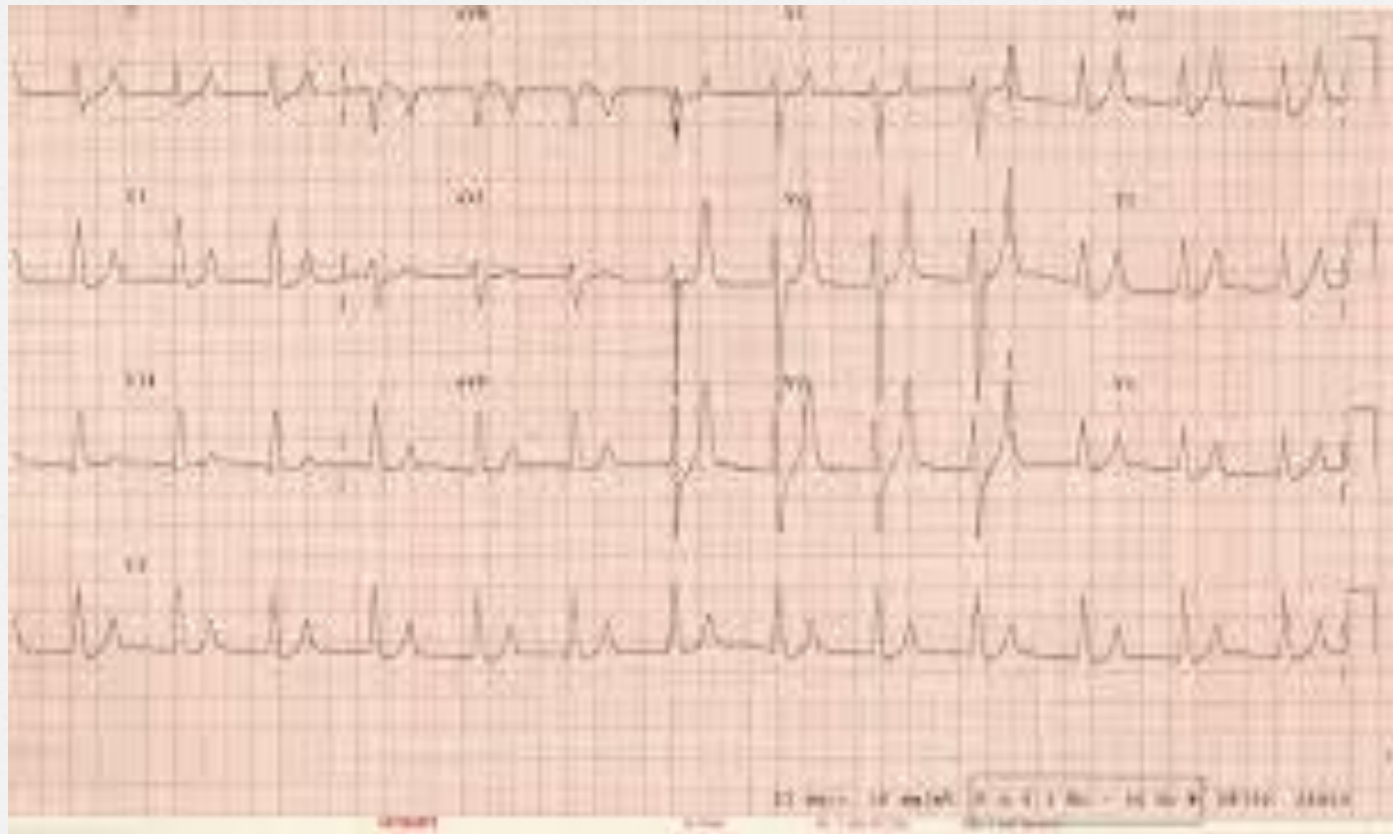
Scarbossa Criteria



Case 7

- 76 year old man with history of HTN, diabetes mellitus, and End stage renal disease presents to the ED with shortness of breath and chest tightness for 4 hours

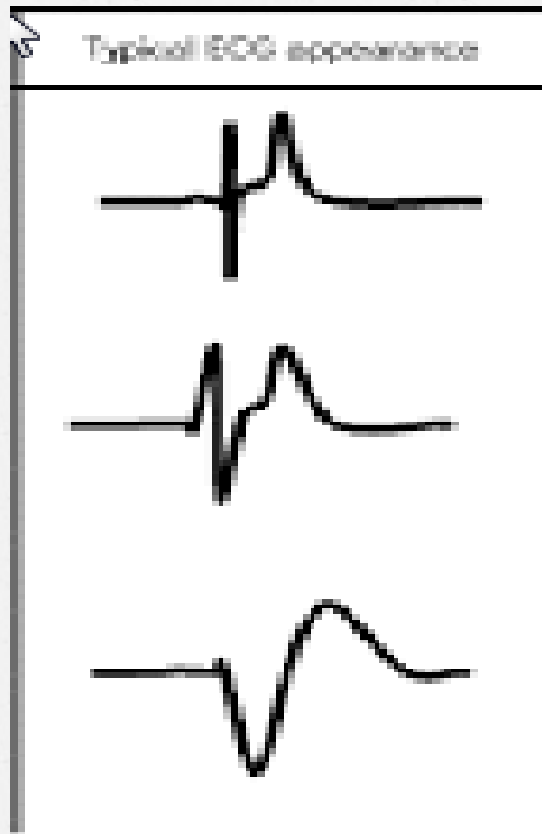
ECG



Diagnosis?

- Acute myocardial infarction?
- Hyperkalemia
 - Potassium on admission was 6.3
 - Patient in further discussion had missed regular hemodialysis sessions during the week

Hyperkalemia



Serum Potassium Levels

- o 5.5-6.5 mEq/L
 - o Peaked T wave
 - o Prolonged PR
- o 6.5-8.0 mEq/L
 - o Loss of P wave
 - o Prolonged QRS
 - o ST elevation
 - o Escape rhythms
- o >8.0 mEq/L
 - o VF, asystole
 - o Bundle branch blocks
 - o Progressive widening of QRS

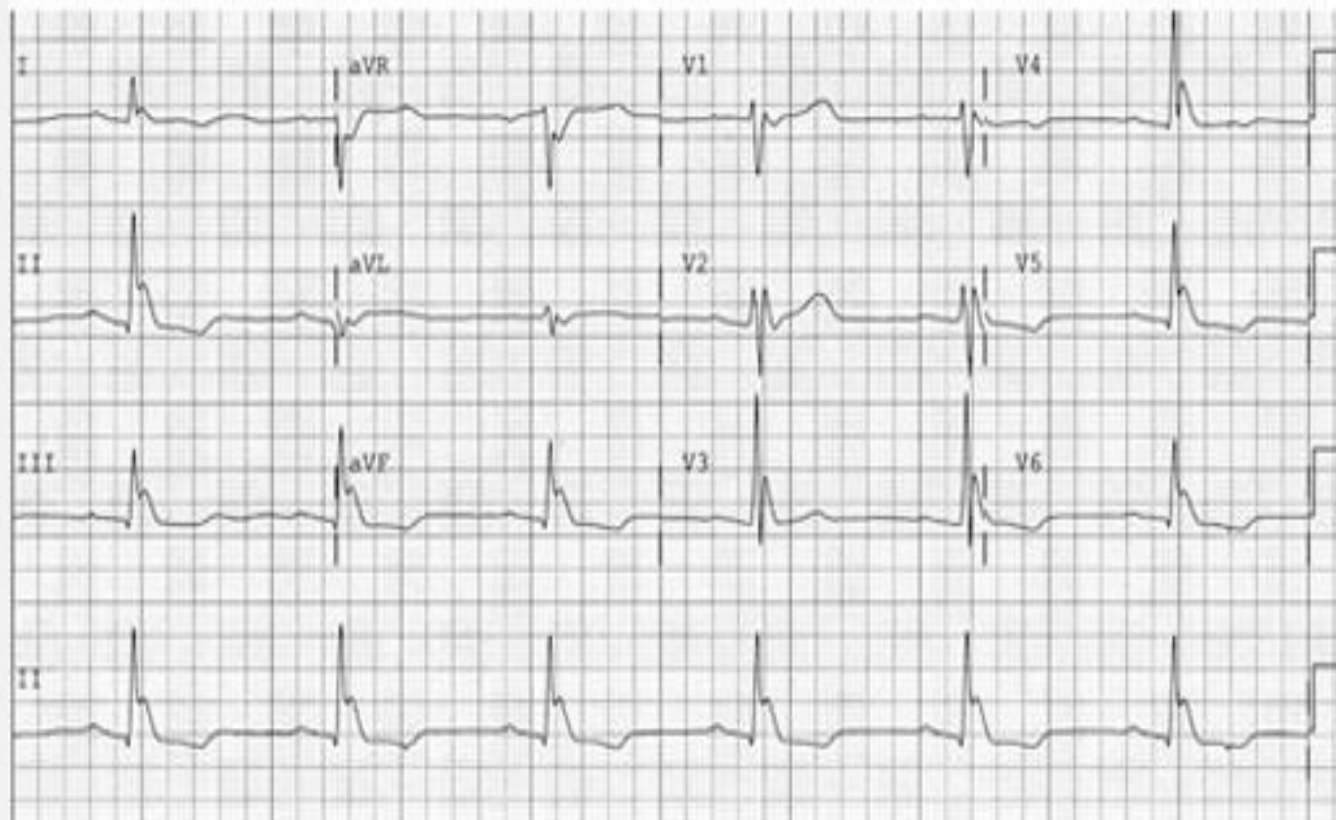
Case 8

- 87 year old man found laying on sidewalk in January
- Had been seen by neighbors taking in groceries from his car in the driveway ~3 hours previously
- EMS was called when patient was seen by neighbor lying in the snow with grocery items all over the sidewalk

Case 8

- o Patient found to be awake but drowsy
- o Reported pain on left side of chest under axilla, worse with inspiration as well as severe pain in right hip
- o Vital sign assessment demonstrated temperature of 85 °F

ECG



Diagnosis?

- Acute Inferior wall STEMI?
- Hypothermia!
 - In further questioning, patient reported he lost his balance when slipping on the ice and was unable to stand due to hip pain

Hypothermia

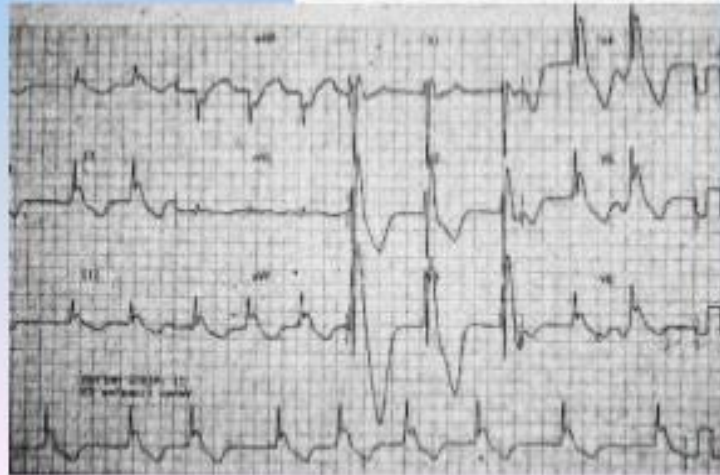
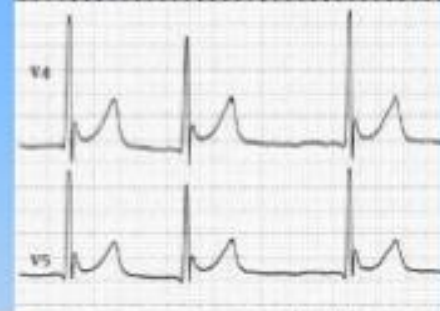
Figure 1. The J wave.

The J wave (or Osborn wave) is associated with moderate hypothermia but has no prognostic significance.



Hypothermia - ECG

- ECG changes from slowed impulse conduction through K channels → prolongation of all ECG intervals
- Elevation of J wave – J/Osborn wave, size related to degree of hypothermia
- Bradyarrhythmias (sinus, AF, junctional, 1st-3rd AV block)
- Shivering artefact
- Ventricular ectopics
- Cardiac arrest due to VT, VF or asystole



Case 8

- ◊ After rewarming, ECG normalized.
- ◊ Surgical ORIF for broken hip
- ◊ Chest Xray with left sided rib fracture

Conclusion

- o ECG interpretation is vital to recognize high risk features for clinical events
 - o **Diagnosis of STEMI**
 - o Cardiac arrest, heart block
 - o Guide medical and procedural therapy options
- o While recognition of ST Elevation myocardial infarction is of utmost importance, STEMI mimics can be frequently encountered and challenging



Thank you!!!